

What is claimed is:

1. A method of joining optical fiber preforms comprising:

aligning first and second optical fiber preforms, the first and second optical fiber preforms each having an opposing endface;

forming an electric arc extending between first and second electrodes, the electric arc extending through a gap between the opposing endfaces;

moving the first and second optical fiber preforms together so as to contact the opposing endfaces and join the first and second optical fiber preforms.

2. The method according to claim 1 wherein the first and second electrodes comprise tungsten and a material selected from the group consisting of thorium, zirconium, cerium and lanthanum.
3. The method according to claim 1 wherein an inert gas is flowed between the first and second electrodes.
4. The method according to claim 3 wherein the flow of inert gas comprises at least two gas streams flowing in opposition to each other
5. The method according to claim 1 wherein the electric arc is formed by supplying an alternating current to the first and second electrodes.
6. The method according to claim 5 wherein the alternating current has a substantially square waveform.
7. The method according to claim 1 further comprising the step of providing relative motion between the first and second electrodes and the first and second performs during

heating.

8. The method according to claim 7 wherein the relative motion comprises rotating the first and second electrodes about a longitudinal axis of the first optical fiber preform.
9. The method according to claim 1 wherein the electric arc has a length of at least about 1 inch.
10. The method according to claim 9 wherein the electric arc has a length of at least about 3 inches.
11. The method according to claim 9 wherein the electric arc length is at least about 5 inches.
12. The method according to claim 1 wherein the gap between the opposing endfaces during heating is less than about 10 mm.
13. The method according to claim 1 wherein the forming step comprises forming a plurality of electric arcs extending between a plurality of first and second electrodes, the plurality of first and second electrodes arranged in pairs wherein each pair comprises a first and second electrode.
14. The method according to claim 13 wherein a frequency of an alternating current supplied to a first pair of first and second electrodes is one half the frequency of the alternating current supplied to an adjacent pair of first and second electrodes.
15. The method according to claim 14 wherein the alternating current supplied to the first pair of first and second electrodes is phase locked to the alternating current supplied to the adjacent pair of first and second electrodes.

16. The method according to claim 1 further comprising drawing the joined optical fiber preform into an optical fiber.
17. An apparatus for joining optical fiber preforms comprising:
 - a first and second electrode, the electrodes being spaced apart by a distance of at least about 1 inch;
 - an electrical power supply in electrical communication with the first and second opposing electrodes for supplying a current to the first and second electrodes.
18. The apparatus according to claim 17 wherein the power supply is capable of providing an alternating current having a substantially square waveform.
19. The apparatus according to claim 17 comprising a plurality of first and second opposing electrodes.
20. An optical fiber draw tower comprising the apparatus of claim 17.